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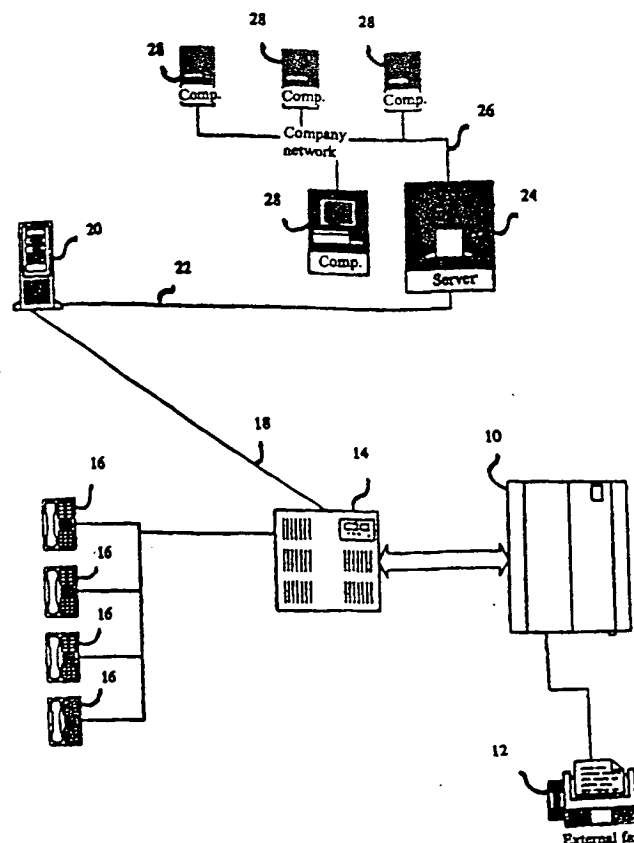
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## (57) Abstract

The present invention relates to a method and to an arrangement (20) for converting fax messages to e-mail via reserved connection numbers in a telephone exchange (10, 14) for the distribution of converted fax messages to computers (28) having allotted extension or connection numbers and connected to a company data network (26).



## METHOD AND ARRANGEMENT FOR RECEIVING MESSAGES

### TECHNICAL FIELD

The present invention relates to a method and to an arrangement for receiving fax  
5 messages via a data network with connected computers. The present invention relates  
specifically to a fax server that converts received faxes to e-mail which is distributed via a  
server for distribution of e-mail over the data network.

### BACKGROUND OF THE INVENTION

It is well known that fax administration is problematic in several respects, such as  
10 secrecy deficiencies, paper waste, inefficiency, and also environmentally related problems.

Many companies have hitherto been satisfied with solving fax handling procedures  
through common fax letter boxes or by placing several fax machines in the various  
departments.

Traditional fax communication is encumbered with several drawbacks. New fax  
15 machines are expensive to buy and require a new telephone subscription for each fax  
machine. New fax machines also require comprehensive wiring.

Conventional fax machines must be monitored with respect to received messages,  
which is ineffective. It is necessary for someone to constantly keep a watch on the machine  
and to distribute the messages received thereon. There is also a danger of messages that lack  
20 title pages being delivered to the wrong person or wrong department. Fax messages are very  
often sent within industries without a title page, since it is often considered an unnecessary  
waste of time to prepare a title page, for instance because the sender and the receiver have  
earlier agreed to the transmission of the fax message by telephone. It is possible that the fax  
receiver becomes engaged in other duties during the lapse of time between the telephone  
25 agreement and the fax transmission and completely forgets that a fax message is being sent.  
In such a case, the person attending the fax machine and distributing received messages will  
be unable to determine the person or department to which the message is sent.

Fax handling also has environmental drawbacks. Laser fax machines generate ozone  
dust, which is harmful to the health. Furthermore, fax machines placed in working offices  
30 have a high sound level, which can inflict noise injuries on persons working in the vicinity  
of the machine.

Other fax machines, such as roll fax machines using thermopaper have a short useful life. It is not viable economically for most companies to provide a fax machine for each employee.

It is usual for several persons or departments to share a fax machine, which results in a low level of secrecy, i.e. it is highly probable that fax messages will be read by persons who are not directly concerned with the message in question.

US-A 4,941,170 describes an e-mail distributing system in which fax messages are transmitted via the e-mail system. The system operates in accordance with the OCR principle, which means that a fax message is received as an image in a selective format of the type TIF, BMP, PCX, etc. When receiving the "image", i.e. the fax message, the image is scanned in accordance with a coordinate system via OCR software, to establish an identity that refers the fax message to an address, for instance to the identity of a physical person, in the local "e-mail office", e.g. a local e-mail server. As will be evident from the Abstract of US-A 4,941,170, the sender of a fax message is required to mark the message so as to enable the receiver to identify the addressee, meaning that the receiver of the fax message must know where to look in the image to find the mark. It is also necessary for the sender of a fax message to mark the message in the correct place in the image in order for the receiver to be able to identify the addressee. Sender and receiver must therefore be synchronized with one another with regard to the information in the image.

The system described in US-A 4,941,170 has been available commercially for many years.

### SUMMARY OF THE INVENTION

One object of the present invention is to provide fax connections in a telephone exchange or telephone switchboard that is connected to a fax server which converts received fax messages to e-mail and distributes these messages over a data network to connected computers. The invention enables all who are connected to the data network to have their own fax via e-mail, i.e. the possibility of receiving a fax message at his/her workplace without having access to a conventional fax machine.

The invention relates to a method for receiving fax messages via a data network with connected computers for achieving the objects of and advantages afforded by the present invention. Computers that are connected to the data network are allocated a fax connection

telephone number in a telephone exchange. The telephone exchange places the numbers allocated on an internal or external link, depending on the embodiment of the invention concerned, to a fax server which converts received fax messages to e-mail and forwards the messages over the data network to respective computers connected to the fax numbers in the data network, via an e-mail server. The fax messages are thus received on respective connected computers via e-mail.

In one embodiment of the invention, fax numbers for connected computers are reserved by number analysis in the telephone exchange, via a table.

The fax server and the e-mail server may both be incorporated in one and the same server.

According to one embodiment of the present invention, the fax server may convert the telephone number of a fax connection to an e-mail address via a database.

The invention also relates to an arrangement for receiving fax messages via a data network, wherewith computers connected to the data network can obtain a fax number in a telephone exchange. The arrangement includes means for receiving fax messages from the telephone exchange and converting fax messages to e-mail, means for signalling status and detecting communication with the telephone exchange, means for interpreting address information, and means for controlling data communication from and to the telephone exchange and for controlling the e-mail to the computers connected to the data network.

The arrangement may be connected between the telephone exchange and the server that handles e-mail distribution. The server handling e-mail distribution may be included in a server common to the arrangement.

In one embodiment of the invention, the telephone number of a fax connection is converted to an e-mail address via a database.

## BRIEF DESCRIPTION OF THE DRAWINGS

So that the invention will be more readily understood and further features thereof made more apparent exemplifying embodiments of the invention will now be described with reference to the accompanying drawings, in which

Fig. 1 illustrates a fax message receiving system according to the present invention; and

Fig. 2 illustrates a fax server that converts received fax messages to e-mail.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention is based on the concept of enabling a computer connected to a data network to receive a fax message without having access to a fax machine.

5 A preferred embodiment of the invention is illustrated in Fig. 1, which illustrates schematically the internal telephone network and data network of a company. The data network may be a local area network (LAN), a wide area network (WAN), and so on.

A company receives via a telephone station 10 a fax message sent by an external fax machine 12. The fax machine is coupled to the company's telephone exchange 14 via the telephone station 10, which includes an AXE switch. Such company switchboards 14 will  
10 normally be MD-110 switchboards, MERIDIAN, etc. The switchboard 14 has connected thereto telephones 16 with respective extension numbers. The switchboard 14 is also connected to a route 18, which in the illustrated case has three channels that are intended solely for fax messages. The route, in turn, connects with a fax server 20 in accordance with the present invention, said server functioning to convert received fax messages to e-mail, e.g.  
15 e-mail. The fax message converted to e-mail is sent over a line 22 to an e-mail server 24 which, in turn, connects with the company data network 26.

The fax message arrives in a so-called file in image format, wherewith there is created in the fax server an electronic-mail message (e-mail) which is connected to or enclosed in the image format file. The expression "converted to e-mail" will therefore also  
20 be understood in this light.

The server 24 is intended, among other things, to distribute e-mail over the data network to computers 28 connected thereto. Each computer 28 in the data network 26 that can receive e-mail has been allocated an extension number in the telephone exchange or switchboard 14.

25 In order to configure the company switchboard 14, there is created a number series by so-called number analysis in the switchboard 14 through the medium of a table that is reserved for solely fax traffic. By way of example, the switchboard or telephone exchange of a company has been allocated a main telephone number 134000 with conventional telephone extension numbers ranging from 134000 to 134400. The number series 134500 to  
30 134599 has been reserved for fax traffic, in accordance with the present invention. All traffic directed to the number series 134500 to 599 from, for instance, fax machines 12 will be

controlled to a specific interface, in the illustrated case a telephone switchboard or exchange MD-110 from Ericsson, designated TLU23. The letters TLU have no relevant significance, but merely refer to Ericsson's ABC classification, such as AXE, etc. TLU23 is the interface that is connected to the fax server 20 with a possible personal computer.

5 TLU23 can be configured to send information in what can be called "forwards" on a current connection.

A typical interface used, e.g., for signalling between the company exchange 14 in the present invention and servers, such as the server 20, is designated E&M (Ear & Mouth).

Upon receipt of a call from the fax machine 12 to the fax connection number  
10 134557, TLU23 will send the digits 557 in the number series for fax connections on selected connection of said three channels to the fax server 20. This information is sent in the form of DTMF signalling (Dual Tone Multiple Frequency), which is followed by the establishment of a telephone connection with the fax server 20 where the fax message is received. The fax message is therewith converted to e-mail via means for converting fax signalling to a text  
15 message in e-mail.

The person or the computer that has been allocated the received fax number, in this case 557 in the number series 134557, is checked in a database in the fax server 20. A corresponding address in the internal mail system is checked at the same time, wherewith the fax message converted to e-mail is distributed over the data network 26 to the fax receiving  
20 computer having extension number 557, via the line 22 and the e-mail server 24.

As opposed to known technology described, for instance, in the aforementioned publication US-A 4,941,170, the present invention "seizes" the addressee immediately in the telephone station or switchboard 14, without scanning the fax message to look for a specific identity. When the identity of the addressee has been established in the switchboard 14, the  
25 document is received and distributed to the correct person via an existing e-mail. No difference is noticed with regard to the sender of the fax message as to whether the message has been sent to an arrangement in accordance with the present invention or to a conventional fax machine 12.

It is therefore totally irrelevant of how or from where a fax message is sent, which  
30 software is used, how the fax message is composed, or whether it is sent from a conventional desktop fax machine.

According to the present invention, it is unsatisfactory to be dependent on both sender and receiver with regard to a general transmission media such as a fax machine.

Fig. 2 is a schematic illustration of the construction of an inventive fax server for receiving fax messages and converting said messages to e-mail for forwarding to a server 24 and to the correct extension number in the company's data network 26. The server 20, which may be a personal computer, receives the fax message sent to extension number 557 via one of the channels in the route 18. The fax message arrives at a fax-receiving line interface board, in the illustrated case three lines per module. The fax message is converted to e-mail to text or graphic files for e-mail, via fax signal conversion means.

The server 20 also includes a digital board for status signalling and detection of fax messages to, e.g., a telephone switchboard or exchange, such as MD-110, among other things, i.e. a board 32 which synchronizes and monitors communication between the switchboard 14 and the line interface board 30 and fax server 20 respectively. The server also includes means for detecting and interpreting address information from the switchboard 14.

The server 20 is controlled by requisite means for controlling towards the switchboard 14 and the network 26 concerned.

In one alternative embodiment of the invention, a fax message can be sent directly to a fax server 20 from a parent telephone exchange 10 with DTMT signalling or decadic pulse signalling, e.g. through an AXE exchange or some other type of exchange, via trunk lines, without establishing communication with a company exchange 14. In this case, the parent exchange 10 initially sends identity tones in searching for extension numbers, therewith enabling the detection and forwarding of fax messages through direct lines from the parent exchange 10 to the fax server 20 in accordance with the aforescribed procedure, but without E&M signalling.

The aforesaid means can be implemented either totally or partially through the medium of software that controls processors and other integrated circuits for converting fax messages to e-mail.

It will be understood that the invention is not restricted to the aforescribed embodiments and that it is the scope of the following Claims that defines the invention to those skilled within this technical field.

## CLAIMS

1. A method of receiving fax messages via a data network (26) with computers (28) connected thereto, characterized in that the computers connected to the data network (26) can obtain a fax connection telephone number in a telephone exchange (10, 14) which places  
5 the numbers allocated on a link with an interface to a fax server (20) which converts received fax messages to e-mail and forwards said messages, via a connection (22) and a server, over the data network (26) for e-mail to respective computers connected to said fax numbers in the data network (26), said fax messages being received as e-mail in respective connected computers.
- 10 2. A method according to Claim 1, characterized in that fax numbers for connected computers are reserved by number analysis in the telephone exchange (14) via a table.
3. A method according to Claim 1 and 2, characterized in that the fax server (20) and the e-mail server (24) are included in one and the same server.
4. A method according to Claims 1-3, characterized in that the fax server (20)  
15 converts the telephone number connection of a fax to an e-mail address, via a database.
5. An arrangement (20) for receiving fax messages via a data network (26), wherein computers (28) connected to the data network can obtain a fax number in a telephone exchange (10, 14), characterized in that the arrangement includes means (30) for receiving a fax message from the telephone exchange and converting said message to e-mail, means  
20 (32) for signalling status and detecting communication with the telephone exchange, means for interpreting (34) address information, and means (36) for controlling data communication from and to the telephone exchange and for controlling the e-mail to the computers connected in said data network (26).
6. An arrangement according to Claim 5, characterized in that the arrangement is  
25 connected between the telephone exchange (10, 14) and the e-mail distributing server (24).
7. An arrangement according to Claim 5 and 6, characterized in that the arrangement and the e-mail server (24) are included in a server.
8. An arrangement according to Claims 5-7, characterized in that the arrangement converts the fax connection telephone number to an e-mail address, via a database.



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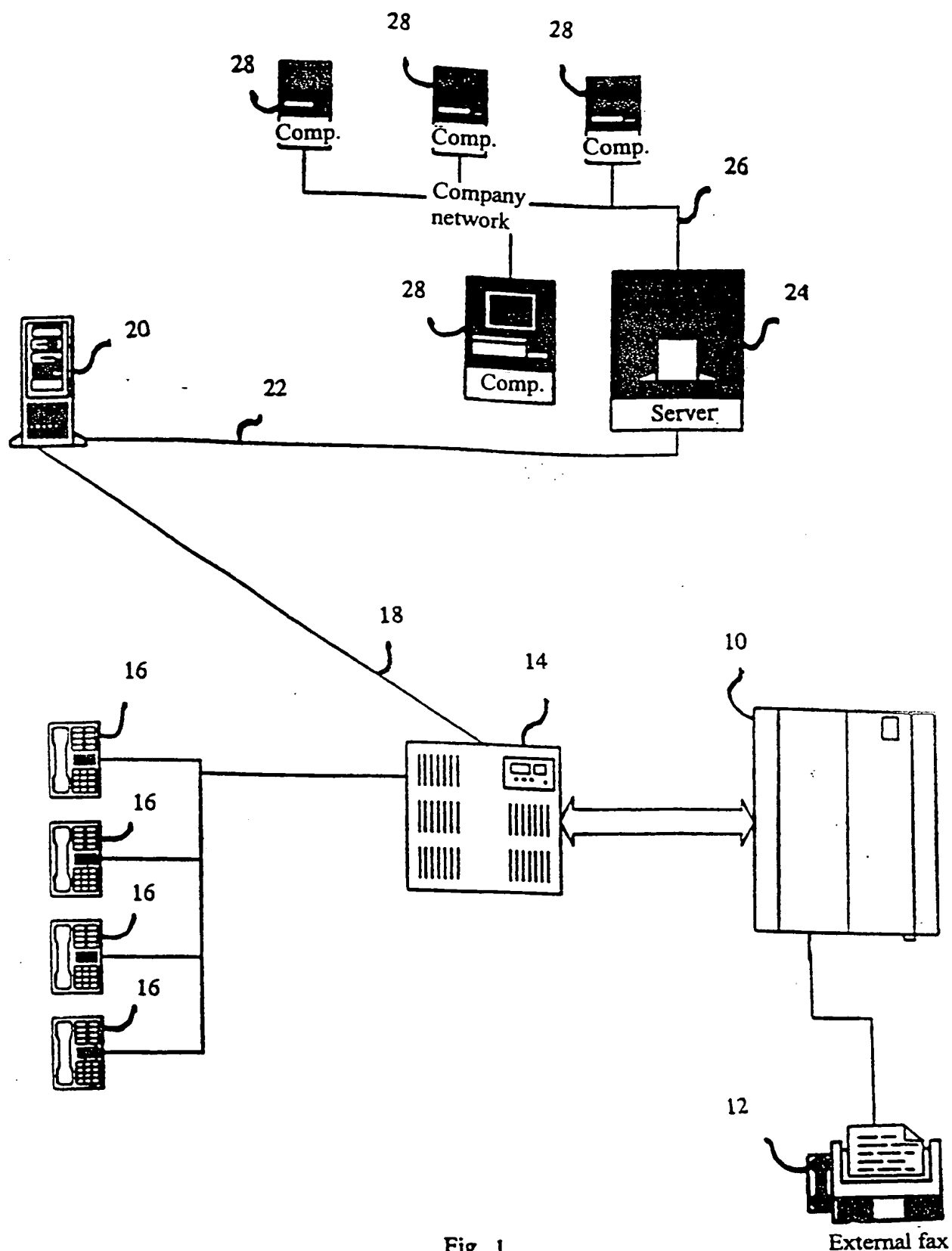


Fig. 1

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